NON-PUBLIC?: N
ACCESSION #: 9303040201
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Beaver Valley Power Station Unit 2 PAGE: 1 OF 5

DOCKET NUMBER: 05000412

TITLE: Reactor Trip and Safety Injection Due To Comparator Card Failure In A Main Steam Pressure Channel
EVENT DATE: 01/30/93 LER #: 93-002-01 REPORT DATE: 03/01/93

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 092

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(ii) & OTHER: Special

LICENSEE CONTACT FOR THIS LER:
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Nuclear Operations

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: SB COMPONENT: JX MANUFACTURER: W120
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On 1/30/93, with the Unit at 92 percent power, the bistables for Loop "A" Channel II main steam pressure were in a tripped condition for transmitter replacement. At 0124 hours, the Loop "A" Channel III main steam pressure transmitter experienced a fuse failure which tripped the bistables for that channel, generating a Low Steamline Pressure Safety Injection (SI) signal. The SI signal caused a reactor trip and SI flow to the reactor coolant system. Operations personnel entered Emergency operating Procedure E-0 and the plant was stabilized in Hot Shutdown. The emergency diesel generators started as designed, but did not load due to the availability of offsite power. The auxiliary feedwater pumps automatically started and supplied feedwater to the steam generators. All other SI equipment operated as designed. The cause for this event was a comparator card power supply failure in the "A" Channel III main steam pressure circuit. This tripped the bistables for that channel,

which in conjunction with the tripped bistables for Loop "A" Channel II, resulted in a SI and reactor trip signal. There were no safety implications as a result of this event. The SI equipment including the emergency diesel generators, standby high head charging pump, auxiliary feedwater pumps, standby service water pump and the associated valves all actuated to their design positions.

END OF ABSTRACT

DESCRIPTION OF EVENT

On 1/30/93, with the Unit in Power Operation (Operating Mode 1) at 92 percent reactor power, the bistables for Loop "A" Channel II main steam pressure,, 2MSS-P474, were in a tripped condition for transmitter replacement and the eighteen month loop surveillance test. Instrument and Control personnel had performed an inspection of the transmitter as a result of a 10CFR21 notification. During the course of the inspection wiring was inadvertently broken which necessitated transmitter replacement. On 1/30/93, 2MSS-P474 was awaiting re-installation of insulation prior to return to service. At 0124 hours, the Loop "A" Channel III main steam pressure transmitter, 2MSS-P475, experienced a power supply circuit failure on the low pressure comparator card, which caused the protective fuse to de-energize the circuit and trip the bistables for this channel. As a result, a Low Steamline Pressure Safety Injection (SI) Signal and a Main Steamline Isolation signal were generated. The SI signal resulted in SI flow to the reactor coolant system, Phase "A" Containment Isolation, Feedwater Isolation, and a reactor trip. operations personnel correctly utilized Emergency Operating Procedure (EOP) E-0 "Reactor Trip or Safety Injection". All reactor protection system (RPS) and Engineered Safety Features (ESF) components functioned as designed. The emergency diesel generators also started as designed, but were not required to load due to the availability of offsite power. At 0131 hours, EOP ES-1.1 "SI Termination" was entered. At 0135 hours, an Unusual Event was declared in accordance with the Emergency Preparedness Plan due to the Emergency Core Cooling System (ECCS) actuation. In accordance with the Emergency Operating Procedures, the Safety Injection (SI) and Containment Isolation Phase "A" (CIA) signals were reset at this time.

Approximately 2163 gallons were injected into the reactor coolant system. Decay heat removal was accomplished using the Steam Generator Atmospheric Steam release Valves. At 0145 hours, normal charging and letdown were established. At 0148 hours, dual indication was observed on the "C" Main Steam Atmospheric Steam Release Valve. All initial notifications in accordance with the EPP were completed at 0150 hours. The Main Steamline

Isolation signal was reset at 0151 hours and the emergency diesel generators were shutdown at 0152 hours. At 0157 hours, the normal plant procedure for recovery from an inadvertent safety injection was entered. The steam driven auxiliary feedwater pump and the "B" motor driven auxiliary feedwater pump, 2FWE*P23B, were shutdown at 0209 hours. The "A" motor driven auxiliary feedwater pump, 2FWE*P23A, was shutdown at 0211 hours due to a report of oil discoloration indicating possible water in the motor oil, and the 23B motor driven auxiliary feedwater pump was restarted.

At 0216 hours, the "C" Main Steam Atmospheric Steam Release Valve was manually isolated due to the valve being stuck in the open position causing the previously mentioned dual indication. During this activity, the steam driven auxiliary feedwater pump received a second automatic start signal due to manipulations of steam and feed flows during the isolation of the "C" Main Steam Atmospheric Steam Release Valve. The Residual Heat Steam Release Valve was opened to supplement the decay heat removal following closure of the "C" Main Steam Atmospheric Steam Release Valve. The startup feedwater pump was started at 0242 hours and the plant was stabilized in Hot Standby (Operating Mode 3). At 0317 hours, 2MSS-P474 was returned to service, allowing reclosure of the reactor trip breakers and realignment for automatic safety injection. The failed circuit card with fuse was replaced and 2MSS-P475 was returned to service at 0350 hours.

At 0302 hours, a high radiation alarm was received on the "C" main steamline. The alarm spiked in and then returned to pre-event values. Radiation Control personnel report normal radiation level readings on the "C" main steamline at 0330 hours. A second check of the "C" main steamline, at 0410 hours, showed normal radiation levels.

At 0545 hours, the Unusual Event was terminated after Chemistry personnel reported no activity in the "C" main steamline after a 1-hour count. Following the event review and completion of corrective actions, a plant startup was commenced at 0755 hours on 1/31/93. The reactor was critical at 0928 hours, and Power Operation (Operating Mode 1) was entered at 1055 hours.

CAUSE OF THE EVENT

The cause for this event was a power supply circuit failure in the low pressure comparator card, 2MSS-PSL475A, for the Loop "A" Channel III main steam pressure circuit. This caused the protective fuse to open tripping the bistables for that channel, which in conjunction with the tripped bistables for Loop "A" Channel II, resulted in a SI signal and a resulting reactor trip signal.

An investigation of the failed comparator card showed two shorted transistors, T29-1 and T29-2, which are part of the power supply on the card. If one transistor fails or if both are gated "on" at the same time, this will cause the input fuse to fail. Subsequent information received from the vendor on 2/5/93, identified a problem with a transistor, T24, which drives the two T29 transistors found failed. The vendor

recommends replacing the T24 transistor with a faster switching device which will gate the T29 transistors for a shorter period of time. Additional heat sinks are recommended to allow cooling.

REPORTABILITY

This event was reported to the Nuclear Regulatory Commission at 0200 hours in accordance with 10CFR50.72.b.i.iv. This written report is being submitted in accordance with 10CFR50.73.a.2.iv, as an event or condition involving an Engineered Safety Features (ESF) or Reactor Protection System (RPS) actuation.

CORRECTIVE ACTIONS

The following corrective actions have been or will be taken as a result of this event.

1. 2MSS-P474 was returned to service on 1/30/93.

2. The failed circuit card and associated fuse were replaced and 2MSS-P475 was returned to service on 1/30/93.

3. The oil in the 23A motor driven feedwater pump was changed on 1/30/93, however no water was found. The observed discoloration is normal for an operating motor.

4. The "C" Main Steam Atmospheric Release Valve was closed after isolation and removal of the pressure differential across the valve. The valve was successfully stroked and returned to service on 1/30/93. Subsequent stroking under a pressure differential was successful on 2/04/93. No initial cause could be found.

SAFETY IMPLICATIONS

There were no safety implications as a result of this event. The SI

equipment including the emergency diesel generators, high head charging pumps, auxiliary feedwater pumps, service water pumps and the associated valves actuated to their design positions/conditions.

PREVIOUS OCCURRENCES

There is one previously reported event involving an inadvertent safety injection, LER 87-011-00. This event involved testing of two of three steam pressure channels on the "C" steam generator at the same time.

ECCS ACTUATIONS

The number of ECCS Actuations (pre-operational and operational injections) experienced at Beaver Valley Unit 2 to date (including this event) is four (4).

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March 1 1993
ND3MNO:3421

Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, Licensee No. NPD-73
LER 93-002-01

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

In accordance with Appendix A, Beaver Valley Technical Specifications, the following revised Licensee Event Report is submitted:

LER 93-002-01, 10 CFR 50.73.a.2.iv, Reactor Trip and Safety Injection Due to Comparator Card Failure in a Main Steam Pressure Channel."

This revision is being issued to include a reporting requirement

inadvertently omitted and to include the number of ECCS Actuations experienced to date.

L. R. Freeland
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JGT/sl

Attachment

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March 1 1993
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